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ABSTRACT

Occupational information needed for the development of vocational and technical education curricula in agriculture is presented in the report. It discusses the findings of occupational surveys of incumbent workers that relate to the identification of a common core of skills or tasks performed within each of the following vocational education in agricultural taxonomy areas: agricultural production (eight occupations); agricultural business, supply, and service (four occupations); agricultural mechanics (four occupations); and horticulture (four occupations). A total of 1,476 questionnaires were mailed and 720 replies were received. Background information was collected on the total work experience in the occupation, employment at current job, size of business where employed, and preparation for the occupation. Data are provided for 2,013 task statements in agricultural production; 593 task statements in agricultural business, supply, and service; 1,354 task statements in agriculture mechanics; and 786 task statements in horticulture. The common core of skills for the agricultural production industry was divided into areas of farm management, farm mechanics, animal production, and crop production. Data on the common core of skills are presented in tabular form. Conclusions and recommendations are formulated based on the data obtained from the occupational surveys. A selected bibliography is included. (Author/EC)

DETERMINATION OF A COMMON CORE OF BASIC SKILLS IN AGRIBUSINESS AND NATURAL RESOURCES

Tasks Essential To Successful Performance Within Each Of Four Occupational Areas In Agriculture

DEPARTMENT OF AGRICULTURAL EDUCATION
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO 43210

TASKS ESSENTIAL TO SUCCESSFUL PERFORMANCE WITHIN EACH OF FOUR OCCUPATIONAL AREAS IN AGRICULTURE

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IN COOPERATION WITH

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FOREWORD

The Department of Agricultural Education at The Ohio State University is involved in a major programmatic effort to improve the curricula in education programs in agriculture. One product of this effort is this report of tasks common within each of the four occupational areas of agricultural production; agricultural business, supply, and service; agricultural mechanics; and horticulture. The data reported were collected in 20 occupational surveys. A total of 28 occupational surveys were completed and are available as appendixes to the complete final report.

It is hoped that the data reported herein will be useful to curriculum developers working for improved occupational relevance in schools. The profession is indebted to Edgar P. Yoder, Graduate Research Associate, for his work on the project and in preparing much of this report. Also, gratitude is extended to the members of the national and state advisory committees for their timely advise and assistance during the conduct of the project. Members of the state advisory committee included: Dr. Ralph E. Bender, The Ohio State University; Mr. James E. Dougan, Ohio Department of Education; Dr. Harlan E. Ridenour, Ohio Agricultural Education Curriculum Materials Service; Dr. Earl B. Russell, Center for Vocational Education; and Mr. William C. Watt, Montgomery County Area Vocational Center. Members of the national advisory committee included: Dr. William E. Drake, Cornell University; Dr. Jasper Lee, Virginia Polytechnic Institute and State University; Mr. Foy Page, Texas A & M University; Mr. Wallace Reidel, Teacher of Vocational Agriculture, Calmar, Iowa; and Mr. Don E. Wilson, California State Department of Education.

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Occupational information is needed to develop and revise vocational and technical education curricula in agriculture. Personnel responsible for curriculum development generally determine which skills might be taught in a program based upon teacher expertise, advisory committee input, informal and formal community surveys, and/or task inventories.

The Agricultural Education Department at The Ohio State University has utilized and revised a system for obtaining and using occupational information as an effective aid in planning, improving, and updating occupational education curricula. This report presents the findings of occupational surveys that relate to the identification of a common core of skills or tasks within each of the following vocational education in agriculture taxonomy areas:

1. Agricultural Production
2. Agricultural Business, Supply, and Service
3. Agricultural Mechanics
4. Horticulture

The information contained herein may be used by curriculum development specialists, teachers, local and state administrators, and others involved in planning and conducting vocational and technical programs in agriculture.

Rationale

The advent of the career education concept provided a major impetus for a clustering of occupations by the U.S. Office of Education. As a result, 15 career clusters were identified which represented broad areas of the occupational functions of the labor force. One of the career clusters identified was the agriculture and natural resources cluster. McMillen (1975) suggested that each career cluster may then be sub-classified into one or more occupational groups, wherein each occupational group represents specific occupational functions. Each occupational group may be broken down into one or more job families which are composed of jobs that have identical or similar skills and knowledge requirements.

The study was conducted in an attempt to identify in detail the technical competencies needed by workers to enter and advance in agricultural occupations.

Purpose and Objectives

The major purpose of this study was to identify the common tasks which are performed and essential in four major agricultural taxonomy areas. The specific objectives were a determination of a common core of skills essential for successful employment across occupations in:

1. Agricultural Production
2. Agricultural Business, Supply, and Service
3. Agricultural Mechanics
4. Horticulture

Limitations and Delimitations

Several precautions or limitations were identified regarding the results of this study. The limitations were:

1. Only 28 agricultural occupations were surveyed. The 28 occupations were selected as representative without random sampling. Results can therefore only be generalized to these 28 occupations.

2. A mailed questionnaire to incumbent workers was used and reliance was placed on written responses. This meant there was no means of investigating the reasons or thinking which went into formulating the written resources.

3. Reliance was placed upon local business owners or managers to select a "responsible" incumbent worker to complete the questionnaire. There was no means to assure that a "responsible" worker was selected to complete the questionnaire.

4. Reliance was placed upon mailing directories or membership lists from state associations to identify the sample. There was no way of assuring these directories or lists included all incumbent workers in the occupations.

5. Information obtained related only to whether the task was performed and the importance of the task to successful employment in the occupation. Information regarding the relative amount of time spent performing each task and whether the task is essential for entry or advancement was not obtained.

Several other factors tended to narrow the scope of the study. The delimitations of the study were:

1. Information was only obtained from incumbent workers and not from their employers.

2. Only incumbent workers employed in businesses belonging to statewide associations or organizations were included in the survey.

Assumptions

Several important assumptions were made in the conduct of the study. The assumptions were:

1. Incumbent workers provide the most valid information regarding the skills performed in their occupations.

2. A measure of whether the task was or was not performed and the importance of the task to successful employment provides useful information to personnel planning and developing agricultural programs.

3. Responses of respondents were representative of all incumbent workers.

Definition of Terms

Agricultural Business, Supply, and Service Taxonomy

Comprises the occupations which are involved in providing services and consumable supplies used in the production phase of agriculture, including processing, marketing, consulting, and other services.

Agricultural Mechanics Taxonomy

Comprises the occupations which are necessary for performing the common and important operations concerned with the selection, operation, maintenance, repair, and use of agricultural power and agricultural machinery and equipment.

Agricultural Production Taxonomy

Comprises the occupations which are concerned with the principles and processes involved in the planning related to and the economic use of facilities, land, water, equipment, chemicals, finance, and labor in the production of plant and animal products.

Duty Area

A large segment of work performed by an individual composed of two or more related tasks. It is one of the distinct major activities involved in the work performed by the individual. Some examples of duty areas of work for the agricultural equipment mechanic are:

1. Overhauling Engines
2. Maintaining and Repairing Fuel Systems
3. Maintaining and Repairing Hydraulic Systems

Horticulture Taxonomy

Comprises the occupations which are concerned with the culture of plants used principally for ornamental or esthetic purposes. It includes establishing, maintaining, and managing ornamental horticulture enterprises.

Incumbent Worker

The existing job holder employed in a specific occupation.

Job

The duties and tasks actually performed by an incumbent worker.

Occupation

The work, by job title, in which an individual is employed.

Occupational Survey

The procedure for obtaining data to identify the duties and tasks that comprise one or more jobs, job families, or occupational groups or taxonomies.

Skill

The required performance for which training must be provided.

Task

A discrete unit of work performed by an individual. The unit of work generally has a definite beginning and ending, and is performed within a limited period of time. Some examples of tasks for the agricultural equipment mechanic are:

1. Replace piston rings
2. Adjust carburetor
3. Bleed a hydraulic system

Task Inventory

An instrument used for conducting an occupational survey. It is composed of items of identification and background information and a list of duty areas of work and related task statements.

Task Level of Importance

The relative importance of a task to the overall success of the job.

Taxonomy Area

Composed of a group of jobs that are related on the basis of required skills and knowledge.

METHODOLOGY

The specific objectives of the study were accomplished by utilizing data gathered in the project "Determination of a Common Core of Basic Skills for Agribusiness and Natural Resources." In four of seven taxonomy areas, sufficient occupations were surveyed to establish a common core of basic skills within the taxonomy.

Selection of Occupations

Occupations within each taxonomy area were selected by members of the state-level advisory committee in cooperation with the project staff. The criteria utilized in selecting the occupations were:

1. The occupation should be representative of possible career ladders and lattices in agriculture.
2. The occupations should be representative of the total taxonomy area.
3. The occupations within the taxonomy area should provide sufficient opportunity for employment.

Occupations selected for analysis within the production agriculture taxonomy area were:

1. Dairy Farmer
2. Swine Farmer
3. Beef Farmer
4. Horse Farm Hand

5. Commercial Grain Farmer
6. Forage Producer
7. Commercial Vegetable Producer
8. Farm Manager (Owner-Operator)

Occupations selected for analysis within the agricultural business, supply, and service taxonomy area were:

1. Feed Salesman
2. Feed Mill Worker
3. Bulk Fertilizer Plant Worker
4. Chemical Applicator

Occupations selected for analysis within the agricultural mechanics taxonomy area were:

1. Agricultural-Industrial Equipment Mechanic
2. Lawn and Garden Center Equipment Mechanic (Small Engine Mechanic)
3. Agricultural Equipment Dealership Partsman
4. Agricultural Equipment Dealership Set-Up and Deliveryman

Occupations selected for analysis within the horticulture taxonomy area were:

1. Tree Service Worker
2. Greenhouse Worker
3. Floral Designer
4. Retail Landscape and Garden Store Salesman

Data Collection

The results of occupational surveys of the 20 occupations were used in establishing the common core of basic skills within each taxonomy. Data were available for 2,013 task statements in agricultural production; 593 task statements in agricultural business, supply, and service; 1,354 task statements in agricultural mechanics; and 786 task statements in horticulture.

The sample used in collecting the original data was randomly selected in all occupations. An attempt was made to insure that the population for each sample represented various types, sizes, and settings of working conditions.

Production Agriculture Sample

A total sample of 589 incumbent workers was identified for the production agriculture taxonomy. The breakdown of the production agriculture sample by specific occupation is presented

in TABLE I. For all production agriculture occupations except the horse farm hand, the sample was obtained from the 1974-75 directory of the Ohio Young Farmers Association, Inc. using a multi-stage random sampling approach. The stages used in the sampling approach were local Ohio Young Farmers Association, Inc. chapter and individual member.

The sample for the horse farm hand was selected using a stratified random sampling approach. It was not possible to secure a list of the specific names and addresses of horse farm hands. Therefore, a sample of horse establishments employing horse farm hands was obtained from the list of such establishments maintained by personnel at the Agricultural Technical Institute. The strata used in selecting the horse establishments were type of operation and geographical location.

TABLE I

SAMPLE FOR THE PRODUCTION AGRICULTURE TAXONOMY

Occupation	N	Percent of Total Sample for Production Agriculture
Dairy Farmer	74	12.6
Swine Farmer	75	12.7
Beef Farmer	77	13.1
Horse Farm Hand	75	12.7
Grain Farmer	75	12.7
Forage Producer	62	10.5
Commercial Vegetable Producer	84	14.3
Farm Manager (Owner-Operator)	67	11.4
Total	589	100.0

Agricultural Business, Supply, and Service Sample

A total sample of 300 incumbent workers was identified for the agricultural business, supply, and service taxonomy. The breakdown of the agricultural business, supply, and service sample by specific occupation is presented in TABLE II. For all agricultural business, supply, and service occupations except the chemical applicator, the sample was obtained from the 1975 directory of the Ohio Grain, Feed, and Fertilizer Association, Inc. using a stratified random sampling approach. The sample for the chemical applicator was obtained from the 1975 Ohio Pesticide Applicators and Operators directory using a stratified random sampling approach. The strata used were type of business and

geographical location.

TABLE II

SAMPLE FOR THE AGRICULTURAL BUSINESS, SUPPLY, AND SERVICE TAXONOMY

Occupation	N	Percent of Total for Agricultural Business, Supply, and Service Taxonomy
Feed Mill Worker	75	25.0
Feed Salesman	75	25.0
Chemical Applicator	75	25.0
Bulk Fertilizer Plant Worker	75	25.0
Total	300	100.0

Agricultural Mechanics Sample

A total sample of 284 incumbent workers was identified for the agricultural mechanics taxonomy. The breakdown of the agricultural mechanics sample by specific occupation is presented in TABLE III. For all agricultural mechanics occupations except the lawn and garden center equipment mechanic (small engine mechanic), the sample was obtained from the 1975 directory of the Ohio Association of Farm and Power Equipment Retailers using a stratified random sampling approach. The sample for the lawn and garden center equipment mechanic (small engine mechanic) was obtained from the yellow pages in telephone directories. The strate used were type of business and geographical location.

Horticulture Taxonomy Sample

A total sample of 303 incumbent workers was identified for the horticulture taxonomy. The breakdown of the horticulture sample by specific occupation is presented in TABLE IV. For all horticulture occupations, a stratified random sampling approach was used. The strata used were type of business and geographical location. The sample for the tree service worker was obtained from the yellow pages of telephone directories. The sample for the retail landscape and garden center salesman was obtained from the 1975 yearbook of The Ohio Nurserymen's Association, Inc. The samples for the floral designer and the greenhouse worker were obtained from the mailing lists of the Ohio Florist's Association.

TABLE III

SAMPLE FOR AGRICULTURAL MECHANICS TAXONOMY

Occupation	N	Percent of Total for Agricultural Mechanics Taxonomy
Agricultural-Industrial Equipment Mechanic	70	24.6
Lawn and Garden Center Equipment Mechanic (small engine mechanic)	74	26.2
Agricultural Equipment Dealership Partsman	70	24.6
Agricultural Equipment Dealership Set-Up and Deliveryman	70	24.6
Total	284	100.0

TABLE IV

SAMPLE FOR THE HORTICULTURE TAXONOMY

Occupation	N	Percent of Total Sample for Horticulture Taxonomy
Tree Service Worker	76	25.1
Greenhouse Worker	77	25.3
Floral Designer	75	24.8
Retail Landscape and Garden Center Salesman	75	24.8
Total	303	100.0

Data Analysis

Data were available from the 20 specific occupational surveys in the four taxonomy areas. In addition to appropriate respondent background information, each specific task statement was coded as to whether it was performed (1 = Task performed by respondent; blank = Task not performed by respondent) and the level of importance of the task (3 = Essential; 2 = Useful;

1 = Not Important). The information was on IBM cards and had been verified by personnel at the Instruction and Research Computer Center at The Ohio State University.

The data was analyzed using the SOUPAC computer program and the facilities of the Instruction and Research Computer Center. Consultant assistance for analyzing the data was provided by personnel at The Center for Vocational Education. The SOUPAC computer analysis resulted in relative frequencies, means, and rankings for each task statement. The results of the computer analyses were printed in tabular form for ease of interpretation.

Each respondent rated each task as essential, useful, or not important for successful performance in the occupation. This rating of importance was averaged for all respondents in each occupation. The average rating of importance for each task could theoretically range from 1.0 to 3.0, with 1.0 the lowest (all respondents rating the task as not important) and 3.0 the highest (all respondents rating the task as essential).

The criterion for selecting a task for the common core of a taxonomy was as follows: the task must have been rated 2.3 or higher in at least one-half of the occupations in the taxonomy.

FINDINGS

Objectives of the study resulted in the compilation of basic sample background information and the identification of tasks common within the four taxonomy areas of production agriculture; agricultural business, supply, and service; agricultural mechanics; and horticulture.

Description of the Sample

Information regarding the importance of tasks to successful employment within the four taxonomy areas was obtained from incumbent workers in 20 agricultural occupations.

Response to the Survey

A total of 1476 questionnaires were mailed and 720 replies were received. This represented a 48.8% rate of return. The usable rate of return was 43.2% or 638 returns. The response to the survey by taxonomy area is presented in TABLE V.

Total Work Experience in the Occupation

Incumbent workers with varying amounts of total work experience in their occupation were included in the study. TABLE VI

TABLE V

WORKER RESPONSE TO THE SURVEY BY TAXONOMY

	Production Agriculture		Agricultural Business, Service, and Supply		Agricultural Mechanics		Horticulture		Cumulative for all Taxonomies	
	N	%	N	%	N	%	N	%	N	%
Workers in Survey	589	100.0	300	100.0	284	100.0	303	100.0	1476	100.0
Respondents	283	48.0	170	56.7	111	39.1	156	51.5	720	48.8
Usable	255	43.3	140	46.7	105	37.0	138	45.5	638	43.2
Unusable	28	4.7	30	10.0	6	2.1	18	6.0	82	5.6
Nonrespondents	306	52.0	130	43.3	173	60.9	147	48.5	756	51.2

TABLE VI

TOTAL AMOUNT OF WORK EXPERIENCE IN THE OCCUPATION BY TAXONOMY

Taxonomy	N	Mean Years of Total Work Experience
Production Agriculture	NA	NA
Agricultural Business, Supply, and Service	140	12.7
Agricultural Mechanics	105	12.1
Horticulture	137	15.7
MEAN		13.5

summarizes the responses to the question, "How many total years have you worked in the occupation?" This information was obtained from workers in all taxonomy areas except production agriculture. An examination of TABLE VI indicates that as a group, horticulture workers had the greatest average amount of work experience in their occupations; whereas, agricultural mechanics workers as a group had the least average amount of total work experience. The incumbent workers in the three taxonomy areas for which information was available had an average of 13.5 years of total work experience in their occupations.

Employment at Current Job

Incumbent workers with varying amounts of work experience at their current job were included in the study. TABLE VII summarizes the responses to the question, "How many years have you worked at your current job?" An examination of TABLE VII indicates that as a group, production agriculture workers had the greatest average amount of work experience in their current occupation; whereas, agricultural mechanics workers as a group had the least average amount of work experience in their current occupation. The incumbent workers in the occupations had been employed in their current occupations an average of 11.3 years.

TABLE VII

YEARS EMPLOYMENT AT CURRENT JOB BY TAXONOMY

Taxonomy	N	Mean Years at Current Job
Production Agriculture	246	14.4
Agricultural Business, Supply, and Service	140	10.1
Agricultural Mechanics	105	9.5
Horticulture	137	11.2
MEAN		11.3

Size of Business Where Employed

Incumbent workers employed in various size businesses were included in the study. The number of full-time equivalent (two one-half time equivalent employees equal one full-time equivalent) employees in the occupation was used as an index to assess the size of business where employed. TABLE VIII summarizes the information regarding the size of business. An examination of

TABLE VIII indicates that as a group, horticulture workers were employed in businesses employing the greatest number of workers. Agriculture mechanics workers as a group were employed in businesses employing the least number of workers. The incumbent workers for all the occupations where information was available were employed in businesses employing an average of 11.4 workers.

Preparation for the Occupation

Incumbent workers obtained training for their jobs from various sources. TABLE IX summarizes their responses to the question, "Where did you receive preparation for your occupation?" More than one response could be selected by respondents. The most frequent source of occupational preparation was on-the-job training. The second most frequent source of preparation was a high school program. The third most frequent source of preparation was attendance at adult education programs or courses.

TABLE VIII

SIZE OF BUSINESS WHERE EMPLOYED BY TAXONOMY

Taxonomy	N	Mean Number of Workers in the Occupations Employed in the Business
Production Agriculture	NA	NA
Agricultural Business, Supply, and Service	128	4.2
Agricultural Mechanics	91	2.6
Horticulture	123	25.3
MEAN		11.4

Agricultural Production Common Core

A common core of tasks for the agricultural production industry was identified. Because of the breadth of occupations in this taxonomy and because of the variations in farming among geographic locations, the common core was divided into the four areas of farm management, farm mechanics, animal production, and crop production. Tasks found in more than one of these four areas were placed under farm management or farm mechanics.

TABLE IX

SOURCE OF TRAINING RECEIVED FOR THE OCCUPATION BY TAXONOMY

Source	Production Agriculture N	%	Agricultural Business, Service, and Supply N	%	Agricultural Mechanics N	%	Horticulture N	%	Cululative for all Taxonomies N	%
On-The-Job	247	96.9	134	95.7	105	100.0	128	93.4	614	96.4
High School Program	143	56.1	16	11.4	18	17.1	8	6.6	185	29.0
Technical School Program	12	4.7	16	11.4	16	15.2	5	3.6	49	7.7
College/University Program	42	16.5	8	5.7	2	1.9	31	16.8	83	13.0
Adult Education	127	49.8	13	9.3	4	3.8	13	9.5	157	24.6
Company School/ Course	0	0	33	23.6	34	32.4	6	4.4	73	11.5
Other	50	19.6	14	10.0	13	12.4	11	8.1	88	13.8

Farm Management

Tasks which appeared in the questionnaire administered to farm managers generally did not appear in questionnaires administered in the other enterprise areas of agricultural production. This enabled the questionnaires to be kept at a manageable size to secure an acceptable response rate. Tasks were therefore selected as common if they received a rating of 2.3 or higher on the farm manager questionnaire or if they received a 2.3 or higher on four of the other seven questionnaires in this taxonomy area. The common core tasks in farm management appear in TABLE X, organized within appropriate duty areas.

TABLE X

16 AGRICULTURAL PRODUCTION COMMON CORE:

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Performing General Office Work								
File general forms and records								2.9
Meet people								2.3
Use telephone								2.7
Write letters, notes, and memos								2.4
Recording Information								
Balance monthly cash statements								2.7
Make bank deposits								2.8
Maintain accounts payable and receivable								2.7
Write checks								2.8
Record inventory information								2.6
Record crop production information								2.5
Record equipment maintenance information								2.4
Record feed mixing and grinding information								2.6
Record labor information on time cards								2.3
Record livestock production information								2.7
Record farm receipts								2.8
Record farm expenses								2.8
Maintain monthly cash expense and receipt summary								2.3
Determine the kinds of records to be kept								2.5
Inventorying the Farm Business								
Determine inventory on hand								2.4
Calculate depreciation								2.6
Establish value on assets and chattels								2.4
Identify resources to be inventoried								2.3
Identify resources which are or are not depreciable								2.4
Select depreciation schedules								2.4
Following Legal Requirements								
Follow laws relating to chemical usage	2.8	2.8	2.8		2.7	2.5	2.8	2.8
Determine when to consult lawyers and specialists								2.5
Evaluate regulations of various government programs								2.5
Follow legal regulations in purchasing land								2.5
Follow legal regulations regarding inheritance								2.3

TABLE X (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 17

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Identify property rights of owners								2.7
Identify rights and liabilities of tenants and landlords								2.5
Interpret regulations regarding the operation of vehicles by minors								2.6
Planning and Supervising the Labor Supply								
Plan daily work schedule								2.4
Establish priorities on jobs								2.8
Identify peak labor periods								2.7
Determine number of workers needed								2.8
Hire and fire workers								2.6
Train workers to perform various jobs								2.5
Evaluate worker's performance								2.4
Assign specific responsibilities to workers								2.4
Establish pay scales and benefits for workers								2.5
Identify available labor								2.3
Evaluate influence labor utilization has on farm income								2.5
Identify ways to eliminate inefficient use of labor								2.6
Determine whether to hire labor or use custom services								2.7
Determine whether to complete work yourself or hire work done								2.8
Purchasing Merchandise and Supplies								
Determine amount to order								2.8
Determine what to order								2.8
Determine when to order								2.7
Compare and verify costs and quality of products and supplies from various sources								2.7
Determine amount of products and supplies to keep on hand								2.7
Identify various sources of supplies								2.5
Evaluate future supply needs								2.6
Insuring the Farm Business								
Determine amount of insurance to carry								2.8
Determine the kind and type of insurance to carry								2.8

TABLE X (cont.)

AGRICULTURAL PRODUCTION COMMON CORE:

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Determine what to insure								2.8
Determine when to insure								2.7
Evaluate the advantages and disadvantages of insurance plans								2.7
Identify sources of insurance								2.5
Planning and Organizing the Farm Business								
Determine the type of farm operation to be developed								2.9
Determine the size of farm operation to be developed								2.8
Determine whether to form a joint ownership								2.4
Determine whether to participate in government programs								2.3
Determine whether to specialize or diversify								2.5
Develop overall farm plan								2.7
Establish farm family goals								2.5
Establish priorities for utilization of resources								2.3
Identify farm business improvements to be made								2.4
Summarizing and Analyzing the Farm Business								
Calculate crop production efficiency factors								2.7
Calculate family labor and management income								2.4
Calculate investment credit								2.8
Calculate labor efficiency factors								2.3
Calculate livestock production efficiency factors								2.4
Calculate machinery and equipment use efficiency factors								2.3
Calculate management income								2.4
Calculate net farm equity								2.5
Calculate net farm profit								2.8
Calculate net return to capital								2.5
Calculate rate of capital turnover								2.4
Calculate rate of return to capital								2.5
Calculate operating margin								2.5
Calculate percent of gross income absorbed by overhead								2.5
Close and summarize the cash book at end of year								2.9

TABLE X (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 19

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Complete tax forms.								2.7
Decide whether to pay taxes on cash or accrual basis.								2.6
Determine amount of social security to be paid.								2.7
Determine amount of taxes to be paid.								2.6
Determine capital gains or losses								2.8
Determine the personal and farm share of expenses								2.7
Estimate income tax								2.3
Identify the strengths and weaknesses of the farm business.								2.7
Marketing and Shipping Agricultural Products								
Calculate expected returns and profits from sales.	2.4	2.3	2.7		2.5		2.5	2.9
Select markets.	2.5	2.4	2.8		2.6		2.4	2.4
Interpret market reports.	2.4	2.4	2.8		2.4		2.3	
Analyze market cycles		2.3	2.5		2.3			
Select appropriate marketing system		2.6	2.4		2.4		2.3	2.9
Determine influence middlemen and retailers have on producer's prices.		2.3			2.5			2.3
Determine whether to hold products over for another year's income.		2.3	2.4		2.7			2.6
Determine when to market.		2.6	2.6					2.5
Determine when products are ready to market .	2.4	2.8	2.8					2.5
Determine influence supply and demand has on prices.								2.4
Planning the Buildings and Structures Program								
Determine returns expected from building investments.								2.6
Determine size of buildings and structures needed								2.6
Determine whether permanent or temporary structures should be built								2.6
Determine whether single purpose or multiple purpose buildings are needed								2.6
Determine whether to remodel or replace current buildings and structures								2.6
Determine where to locate buildings and structures								2.7

TABLE X (cont.)

20 AGRICULTURAL PRODUCTION COMMON CORE:

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Estimate future building and structure needs.								2.5
Evaluate advantages and disadvantages of specific kinds and types of buildings and structures								2.5
Identify building repairs needed								2.5
Select type of building materials to be used								2.3
Work with others in designing and planning buildings and structures								2.6
Select mechanical systems for use in buildings								2.4
Planning the Equipment and Machinery Program								
Calculate equipment operation costs								2.4
Determine current condition of machinery and equipment								2.7
Determine size of machinery and equipment to purchase								2.8
Determine what machinery and equipment is needed								2.8
Determine whether to do custom work for others								2.5
Determine whether to own machinery or lease it								2.3
Determine whether to purchase equipment needed or hire custom work								2.6
Determine whether to repair equipment needed or hire custom work								2.4
Determine whether to repair or trade-in equipment and machinery								2.8
Determine whether to purchase new or used equipment								2.7
Determine returns expected from equipment investments								2.5
Develop regular equipment maintenance schedule								2.6
Evaluate advantages and disadvantages of specific types and brands of equipment and machinery								2.7
Identify equipment repairs needed								2.8
Identify ways to reduce equipment costs								2.8
Planning the Livestock Program								
Determine amount of feed to be purchased in addition to home grown feeds								2.6
Determine resources needed for livestock program								2.7

TABLE X (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Determine the amount of livestock for the farm								2.6
Determine the grade of livestock for the farm								2.4
Determine whether to expand or contract the livestock enterprises								2.4
Establish livestock enterprise production goals								2.4
Identify resources available for the livestock enterprises								2.3
Identify special production practices needed to attain production goals								2.4
Identify ways to increase the efficiency of the livestock program								2.6
Determine the type of livestock for the farm								2.3
Planning the Crop Program								
Determine amount of crops to be grown								2.8
Determine crop enterprises for the farm								2.7
Determine crop rotations to be followed								2.6
Determine whether to expand or contract crop enterprises								2.7
Develop crop budgets								2.4
Develop crop production schedule for farm								2.7
Establish crop production goals								2.6
Identify resources available for crop program								2.7
Identify special production practices needed to attain production goals								2.7
Identify ways to increase crop efficiency								2.8
Identify resources needed for the crop program								2.7
Plan field layout								2.5
Financing the Farm Business								
Calculate interest rates								2.8
Determine amount of credit needed								2.9
Determine length of loan needed								2.9
Develop budget to determine if it will pay to borrow money								2.8
Develop debt repayment schedule								2.8
Develop overall credit plan needed for farm								2.8
Evaluate importance of good credit ratings								2.7
Evaluate interest terms on loans								2.8

TABLE X (cont.)

AGRICULTURAL PRODUCTION COMMON CORE:

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm.Vegetable Producer	Farm Manager
Evaluate loan repayment terms and conditions							/	2.7
Evaluate repayment capacity								2.7
Identify and evaluate various sources of credit								2.6
Identify factors which influence credit ratings								2.5
Identify purposes for which credit is needed								2.6
Identify the credit strengths and weaknesses of the farm business								2.5
Securing Land								
Determine amount of capital available for securing land								2.7
Determine amount of land needed								2.7
Determine if the land available fits the future farm plan								2.4
Determine the type of farm and land needed								2.6
Determine when to buy land								2.4
Determine whether to buy, rent, or lease land								2.7
Evaluate land price cycles								2.5
Evaluate lease and rental agreements								2.7
Identify available land								2.4
Identify factors that will influence utilization of available land								2.5
Make an appraisal of the land and buildings								2.6

Farm Mechanics

Agricultural mechanics tasks were selected as part of the agricultural production common core if they were rated 2.3 or higher in at least four of the enterprise areas surveyed. The common tasks in farm mechanics appear in TABLE XI, organized within appropriate duty areas.

TABLE XI

AGRICULTURAL PRODUCTION COMMON CORE:

FARM MECHANICS

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Following General Safety Precautions								
Follow safe work habits	2.6	2.7	2.7	2.9	2.7	2.7	2.8	
Identify potential safety hazards	2.6	2.7	2.5	2.8	2.7	2.6	2.7	
Store chemicals	2.4		2.4	2.6	2.8		2.8	
Use fire extinguishers	2.3	2.3	2.5	2.9	2.7	2.8	2.6	
Wear proper protective clothing			2.3	2.6	2.4		2.4	
Ventilate work areas	2.3		2.5	2.5	2.4	2.4	2.6	
Interpret information on labels and signs	2.6	2.6	2.6	2.9	2.8	2.6	2.8	
Use proper lifting and carrying methods			2.4	2.6	2.5		2.5	
Store inflammable materials	2.3	2.3	2.5	2.7	2.6		2.6	
Wear proper work clothes		2.3	2.3	2.6	2.5		2.4	
Adjust safety devices	2.5	2.6	2.6	2.6	2.6	2.4	2.6	
Install safety devices			2.4		2.5	2.4		
Correct potential safety hazards	2.4	2.7	2.6	2.8	2.6	2.4	2.8	
Use electrical connectors and safety devices	2.5	2.7	2.6	2.8	2.6		2.6	
Dispose of excess chemicals	2.3	2.5	2.8		2.3			
Maintaining Equipment								
Add coolant to radiators	2.9	2.5	2.7	2.5	2.9	2.6	2.6	
Add oil to equipment	2.8	2.9	2.7	2.5	2.9	2.8	2.8	
Adjust carburetors	2.3	2.4	2.6		2.6	2.5	2.5	
Bleed diesel fuel system	2.5	2.3	2.6		2.7		2.3	
Change oil and oil filters	2.8	2.7	2.9	2.3	2.9	2.7	2.7	
Clean debris from equipment and vehicles	2.5	2.4	2.6	2.4	2.5	2.3	2.4	
Grease equipment	2.9	2.8	2.9	2.5	2.8	2.8	2.8	
Inflate tires	2.8	2.7	2.9	2.3	2.8	2.4	2.7	
Inspect cooling system for leaks	2.6	2.5	2.6		2.6	2.3	2.6	
Install and adjust belts	2.5	2.6	2.8		2.8	2.5	2.7	
Install and adjust chains	2.6	2.6	2.8		2.8	2.5	2.7	
Install and service battery	2.6	2.4	2.7		2.7	2.4	2.7	
Interpret general maintenance instructions in operator's manuals	2.6	2.7	2.6	2.4	2.7	2.3	2.8	
Remove equipment from storage	2.4	2.3	2.7		2.5		2.4	
Repack bearings	2.5	2.3	2.7		2.6		2.5	
Replace and adjust spark plugs	2.5	2.3	2.7		2.6		2.6	
Replace bearings and seals	2.4	2.6	2.6		2.8	2.3		
Replace spark plug wires	2.3	2.3	2.5		2.4		2.4	
Replace radiator hoses	2.4	2.4	2.6		2.5		2.6	
Replace universal joints	2.3	2.3	2.5		2.4		2.4	
Service air cleaners	2.8	2.7	2.7		2.8	2.4	2.7	
Service fuel strainer, filters, and sediment bowl	2.7	2.6	2.8		2.8		2.7	

TABLE XI (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 25

FARM MECHANICS

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Prepare equipment for storage.	2.5	2.4	2.7		2.5		2.6	
Using and Maintaining Hand and Power Tools								
Adjust tools	2.4	2.5	2.5		2.6		2.4	
Clean tools.	2.4	2.5	2.4		2.7		2.4	
Identify tools	2.3	2.6	2.5		2.5			
Interpret tool operation instructions. . . .	2.5	2.6	2.5		2.5		2.4	
Select tools for specific jobs	2.4	2.3	2.4		2.7		2.5	
Sharpen tools.	2.5	2.3	2.3		2.6		2.5	
Store tools.	2.5	2.4	2.6		2.5	2.7	2.3	
Use hand tools safely.	2.7	2.7	2.8		2.7		2.6	
Use power tools safely	2.7	2.7	2.8		2.8	2.4	2.7	
Set-up tools		2.3	2.4		2.3			
Operating Equipment and Vehicles								
Interpret gauge readings on equipment. . . .	2.8	2.9	2.7	2.5	2.9	2.7	2.8	
Operate equipment and vehicles on public highways.	2.8	2.8	2.8	2.3	2.6	2.5	2.8	
Add wheel and front end weights.	2.4	2.7	2.6		2.5		2.4	
Adjust equipment safety shields.	2.4	2.8	2.8		2.6	2.6	2.7	
Connect front end operated equipment	2.3	2.3	2.5		2.3		2.3	
Connect hydraulic systems and hydraulic operated equipment.	2.7	2.8	2.9		2.5	2.5	2.6	
Correct potential equipment safety hazards . .	2.6	2.7	2.8	2.4	2.5	2.6	2.8	
Connect 3-point hitch equipment.	2.6	2.9	2.6	2.4	2.5	2.4	2.7	
Hitch towed equipment.	2.4	2.5	2.8		2.5		2.7	
Identify equipment safety hazards.	2.5	2.5	2.8	2.5	2.5		2.5	
Install equipment safety shields and devices .	2.5	2.7	2.8		2.5	2.3	2.6	
Interpret hand operating signals	2.3	2.4	2.6	2.4	2.3		2.4	
Interpret safety and operating instructions in equipment manuals.	2.6	2.6	2.7		2.6		2.6	
Interpret safety symbols on equipment. . . .	2.6	2.5	2.7	2.4	2.4	2.4	2.6	
Operate equipment under work conditions. . .	2.7	2.8	2.9	2.7	2.6	2.6	2.7	
Refuel power units	2.8	2.9	2.9	2.5	2.5	2.4	2.7	
Use appropriate equipment and vehicles for specific jobs	2.5	2.8	2.7	2.7	2.7	2.4	2.8	
Constructing and Maintaining Buildings and Structures								
Apply wood and metal preservatives	2.3	2.3	2.4	2.3	2.5			
Clean and oil electric motors.	2.5	2.4	2.4		2.7	2.4		

TABLE XI (cont.)

AGRICULTURAL PRODUCTION COMMON CORE:

FARM MECHANICS

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Determine cost of construction and repairs	2.4	2.6	2.5		2.5			2.6
Develop bill of materials	2.3	2.4	2.3		2.3			
Hang and repair doors	2.4	2.6	2.5	2.4	2.3	2.4		
Install and repair electrical cords and wires	2.7	2.4	2.6		2.5	2.4		
Repair minor leaks in roof of buildings	2.5	2.4	2.5		2.5			
Replace belts and pulleys on equipment in structures	2.7	2.6	2.5		2.6	2.3		
Reset circuit breakers	2.6	2.7	2.7	2.4	2.6	2.5		
Replace electrical switches	2.7	2.6	2.3		2.4	2.4		
Replace fuses	2.6	2.7	2.7	2.3	2.5	2.5		
Replace lighting fixtures and bulbs	2.6	2.6	2.4	2.6	2.4			
Replace valves in water lines	2.3	2.6	2.4		2.3	2.4		
Replace or repair water faucets	2.4	2.4	2.4		2.3	2.3		
Install and replace water pipes		2.4	2.4		2.3			
Replace window panes		2.3		2.3	2.3			
Wire simple electrical circuits	2.3	2.4	2.4		2.3			
Construct and repair fences and gates	2.6	2.7	2.6	2.7	2.3	2.4		
Repair wood panels and siding in storage areas and on buildings	2.3	2.3	2.4		2.3			
Remove trash from floors and work areas	2.3	2.6	2.4		2.4		2.4	
Repair metal structures with arc or oxy-acetylene welder		2.3	2.3		2.3			
Assembling and Installing Equipment and Structures								
Adjust belts on equipment	2.7	2.6	2.8	2.3	2.7	2.6	2.5	
Adjust chains on equipment	2.7	2.8	2.6	2.3	2.7	2.6	2.5	
Adjust controls on equipment	2.6	2.7	2.7	2.4	2.8	2.5	2.5	
Adjust safety shields on equipment	2.4	2.5	2.7	2.3	2.7	2.5	2.5	
Check for missing equipment parts or hardware	2.6	2.6	2.8	2.4	2.6	2.4	2.4	
Follow written assembly instructions	2.5	2.5	2.7	2.4	2.6		2.5	
Identify hardware	2.3	2.5	2.3		2.4		2.3	
Inspect assembled equipment and structures for operating defects	2.6	2.6	2.8		2.4		2.3	
Install equipment and structures in proper places	2.6	2.6	2.8	2.4	2.5		2.4	
Interpret assembly diagrams	2.3	2.5	2.4		2.3		2.3	
Interpret assembly instructions	2.3	2.5	2.5		2.5		2.4	
Use proper equipment and tools to assemble and install equipment and structures	2.3	2.4	2.5		2.6			
Marketing and Shipping Agricultural Products								
Load products on carriers	2.3	2.7	2.7	2.8	2.4			

TABLE XI (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 27

FARM MECHANICS

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse, Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Prepare carriers for shipping products		2.3	2.6	2.6	2.5			
Storing Farm Crops								
Use fans and drying equipment					2.5		2.5	

TABLE X (cont.)

22 AGRICULTURAL PRODUCTION COMMON CORE:

FARM MANAGEMENT

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Evaluate loan repayment terms and conditions								2.7
Evaluate repayment capacity								2.7
Identify and evaluate various sources of credit								2.6
Identify factors which influence credit ratings								2.5
Identify purposes for which credit is needed								2.6
Identify the credit strengths and weaknesses of the farm business								2.5
Securing Land								
Determine amount of capital available for securing land								2.7
Determine amount of land needed								2.7
Determine if the land available fits the future farm plan								2.4
Determine the type of farm and land needed								2.6
Determine when to buy land								2.4
Determine whether to buy, rent, or lease land								2.7
Evaluate land price cycles								2.5
Evaluate lease and rental agreements								2.7
Identify available land								2.4
Identify factors that will influence utilization of available land								2.5
Make an appraisal of the land and buildings								2.6

Animal Production

Animal production tasks were selected as part of the agricultural production common core if they were rated 2.3 or higher in at least two of the four livestock enterprise areas. The common tasks in animal production appear in TABLE XII, organized within appropriate duty areas.

TABLE XII

AGRICULTURAL PRODUCTION COMMON CORE:

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Following Legal Requirements								
Interpret feed additive withdrawal laws. . . .		2.8	2.8					
Interpret feed additive mixing laws.	2.6	2.5	2.6					
Identify shipping regulations.		2.6	2.4					
Maintaining Livestock Herd Health								
Evaluate influence livestock has on production.	2.8	2.3	2.8					
Identify common livestock internal and external parasites.	2.5	2.8	2.8					
Identify sanitation problems which may affect herd health	2.7	2.8	2.8					
Identify symptoms of nutritional imbalance . .	2.8	2.6	2.8					
Select materials to control internal and external parasites.	2.5	2.8	2.9					
Work with veterinarians in developing the herd health program	2.7	2.6	2.7					
Disinfect and whitewash buildings and equipment	2.5	2.7	2.5					
Select proper chemicals to clean buildings and equipment	2.5	2.5	2.4					
Use insecticide repellents in buildings. . . .	2.5	2.5		2.8				
Apply insecticides to control external livestock parasites	2.7	2.7	2.6	2.6				
Identify symptoms of common livestock diseases	2.7	2.8	2.7					
Identify symptoms of major livestock parasites	2.5	2.7	2.6					
Calculate cost of treatments		2.3	2.3					
Supply medication through feed and water . . .	2.3	2.7	2.6	2.8				
Isolate animals with transmissible diseases. .	2.6	2.7	2.8	2.8				
Select appropriate method to control diseases.	2.6	2.8	2.7					
Worm animals		3.0	2.8					
Vaccinate animals.	2.4	2.7	2.6					
Determine amount of medication or materials needed in specific situations	2.6	2.8	2.7					
Interpret labels on medications and insecticide containers.	2.7	2.9	2.9	2.9				
Give intra-muscular injections	2.7	2.9	2.7					
Observe new animals for symptoms of diseases and parasites	2.7	2.7	2.9					
Determine when a veterinarian should be called	2.9	2.9	2.9	2.9				
Apply medication to cuts and bruises	2.6	2.6	2.7	2.8				
Identify and isolate injured animals	2.6	2.6	2.8					

TABLE XII (cont.)

30 AGRICULTURAL PRODUCTION COMMON CORE:

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Formulating Feeds and Feeding Livestock								
Develop rations	2.7	2.6	2.7					
Calculate cost of rations and feed mixtures	2.7	2.6	2.6					
Calculate feed efficiency	2.3	2.5	2.5					
Classify feeds	2.3		2.3					
Determine amount of feed additives to add to mixture	2.6	2.8	2.7					
Determine amount to feed per animal	2.7	2.5	2.7					
Determine appropriate form for preparing feed	2.3		2.5					
Substitute for various feedstuffs in rations		2.3	2.3					
Determine nutrient requirements for animals	2.5	2.4	2.5					
Determine purpose of feedstuffs in rations and mixtures	2.3	2.3						
Determine purpose of nutrients in rations and mixtures	2.3	2.4	2.4					
Determine relative nutritive value of feedstuffs	2.4	2.4	2.4					
Determine total amount of feed needed for herds	2.6	2.5	2.6					
Determine water requirements for animals	2.3	2.3	2.6					
Determine when additives should be withdrawn	2.5	2.8	2.9					
Determine when rations and mixtures should be changed	2.6		2.6					
Determine which feeds and additives may be included in livestock feed mixtures	2.4	2.6	2.7					
Determine which feedstuffs and the amount that may be substituted in rations	2.3	2.4	2.5					
Evaluate the influence the quality of feedstuffs has on production, consumption and efficiency	2.7	2.4	2.6					
Evaluate how ration imbalance may affect production and efficiency	2.4	2.3	2.5					
Evaluate the influence residues in products have on marketing problems	2.6		2.3					
Identify factors that influence feed requirements and feed efficiency	2.3	2.3	2.4					
Identify factors that influence quality of feedstuffs	2.5	2.3	2.5					
Determine purpose of various additives in rations and mixtures	2.3	2.3						
Interpret feed analysis reports	2.5	2.3						
Interpret feed tags and labels	2.6	2.3	2.6					
Interpret feeding charts and tables	2.3	2.5	2.5					
Select appropriate feeding method	2.4	2.5	2.3					

TABLE XII (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 31

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Determine how feed palatability may be improved	2.3	2.4	2.5					
Work with veterinarian and feed salesman in formulating feeds and planning feeding programs	2.5	2.5	2.5	2.4				
Identify essential nutrients needed in rations and mixtures	2.3	2.4	2.5					
Evaluate how feed additives influence production and efficiency		2.6	2.5					
Determine amount of weight animals should gain		2.5	2.5					
Fill feed troughs and bunks	2.3	2.6	2.8	2.7				
Fill and clean waterers	2.5	2.7	2.7	2.8				
Prepare feed mixtures	2.5	2.7	2.7	2.5				
Wean animals	2.5		2.3	2.5				
Evaluate affect of various feeding practices on carcass composition and feed efficiency		2.4	2.3					
Determine when animals may be started on grains and roughages	2.5		2.8					
Replace salt and mineral blocks	2.4			2.7				
Dry-up lactating animals	2.6			2.6				
Identify moldy or spoiled feedstuffs	2.5	2.8	2.8	3.0				
Marketing and Shipping Agricultural Products								
Classify products for market purposes		2.5	2.5					
Sort animals according to size and weight		2.4	2.5	2.3				
Determine number of animals to load		2.5	2.7	2.5				
Selecting Livestock								
Determine age of livestock	2.6	2.5	2.5					
Establish production goals for culling purposes	2.7	2.4						
Evaluate advantages of breeds		2.4	2.4					
Evaluate general condition of livestock	2.6	2.5	2.6	2.9				
Evaluate influence of consumer's demand on type of livestock to select		2.4	2.5					
Evaluate overall performance and health records of livestock	2.5	2.4	2.5					
Evaluate the degree various traits and characteristics are inherited		2.3	2.3					
Identify reputable sources for purchasing animals	2.4	2.6	2.6	2.8				
Identify parts of animals			2.3	2.8				

TABLE XII- (cont.)

32 AGRICULTURAL PRODUCTION COMMON CORE:

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Inspect animals for defects	2.6	2.7	2.7					
Inspect animals for desirable traits and characteristics	2.6	2.6	2.6					
Select breeding system to follow	2.7	2.4	2.5					
Select foundation stock	2.3	2.6	2.3					
Identify breeds		2.5	2.6					
Breeding Livestock								
Determine due date for animals	2.9	2.7	2.5	2.3				
Determine number of males needed for the breeding herd		2.8	2.5					
Determine when to breed	2.9	2.7	2.5	2.3				
Identify causes of breeding difficulty	2.6	2.5	2.5					
Select a breeding method	2.7	2.4	2.3					
Handling and Disposing of Wastes								
Prevent waste runoff from feedlots and housing quarters	2.4	2.4	2.5	2.5				
Remove dead animals	2.9	2.9	2.9	2.5				
Remove manure from pens and quarters	2.7	2.8	2.7	2.9				
Spread manure on fields	2.7	2.7	2.8	2.7				
Handling and Caring for Livestock								
Assist animals in delivering young	2.8	2.6	2.8	2.6				
Castrate animals	2.3	2.6	2.5	2.4				
Check animal's milk supply	2.6	2.7	2.4	2.5				
Clean newborn animals	2.4		2.3	2.4				
Dehorn animals	2.4		2.5					
Determine space needed for animals	2.4	2.8	2.5					
Disinfect and clip navel cord	2.3			2.6				
Evaluate influence of stress on growth and condition of animals		2.4	2.3					
Help young to nurse	2.4	2.3	2.3	2.4				
Identify sign of approaching birth	2.8	2.7	2.5	2.8				
Identify due dates for animals	2.7	2.7	2.5					
Isolate newly purchased animals for observation		2.6	2.8	2.7				
Mark animals for identification	2.7	2.3	2.5	2.3				
Move animals to parturition facilities	2.6	2.7						
Move feeder animals to feeding quarters		2.5	2.5					
Observe animals regularly for signs of problems	2.7	2.8	2.9	3.0				

TABLE XII (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 33

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Pen animals according to size, weight, and sex	2.5	2.3	2.4					
Remove afterbirth.	2.4	2.4	2.3	2.5				
Remove non-compatible animals.	2.3	2.4	2.3	2.5				
Regulate air movement and temperatures in housing facilities.	2.3	2.7		2.4				
Bed animals.	2.7	2.6	2.7	2.9				

Crop Production

Crop production tasks were selected as part of the agricultural production common core if they were rated 2.3 or higher in at least two of the three crop production enterprise areas. The common tasks in crop production appear in TABLE XIII, organized within appropriate duty areas.

TABLE XIII

AGRICULTURAL PRODUCTION COMMON CORE:

CROP PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Following Legal Requirements								
Interpret chemical application laws.					2.7	2.4	2.8	
Following General Safety Precautions								
Dispose of chemical containers					2.3	2.4	2.8	
Determine when weather conditions create unsafe work situations.					2.4		2.3	
Clean up chemical spills					2.4		2.7	
Recognize symptoms of personal injury or poison from chemicals					2.8	2.4	2.7	
Storing and Warehousing Products and Supplies								
Control temperature and humidity in storage areas					2.6		2.5	
Clean storage areas.					2.6	2.4		
Determine storability of materials					2.9	2.5	2.4	
Testing Soil and Plant Tissues								
Interpret plant tissue test results.					2.3	2.3	2.6	
Interpret soil test results.					2.5	2.4	2.8	
Prepare forms to submit with soil samples. . .					2.3		2.6	
Prepare soil to be submitted to testing laboratory.					2.4	2.4	2.6	
Take representative soil sample.					2.6	2.6	2.3	
Fertilizing Crops								
Calculate estimated costs of fertilizer and lime recommendations.					2.6	2.4	2.5	
Determine amount of fertilizer and lime to apply					2.7	2.7	2.8	
Determine kind of fertilizer and lime to apply					2.8	2.7	2.8	
Determine when to apply fertilizer and lime. .					2.6	2.4	2.7	
Evaluate affect leaching and placement have on nutrient availability					2.4		2.5	
Evaluate influence soil pH has on nutrient availability.					2.6		2.6	
Identify function of lime in crop production .					2.5		2.5	
Identify function of major nutrients in crop production.					2.6		2.6	

TABLE XIII (cont.)

AGRICULTURAL PRODUCTION COMMON CORE:

CROP PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Identify function of micro nutrients in crop production.					2.4		2.3	
Identify nutrient deficiency symptoms in growing crops					2.4		2.5	
Interpret fertilizer and lime recommendations from soil tests					2.8	2.3	2.7	
Interpret labels on fertilizer bags.					2.6	2.3	2.7	
Interpret manufacturer's fertilization rate charts.					2.4	2.3		
Evaluate influence various nutrients have on plant growth.					2.4		2.7	
Determine the nutrient requirements of various plants:					2.7	2.3	2.7	
Select appropriate method to apply fertilizer.					2.7	2.3	2.7	
Evaluate influence factors have on fertilizer effectiveness					2.6		2.6	
Calibrate fertilizer application equipment					2.8	2.4		
Adjust rate of application for specific conditions.					2.7	2.5	2.7	
Recognize signs of fertilizer injury					2.5		2.5	
Identify factors that influence fertilizer requirements.					2.5		2.6	
Controlling Plant Insects and Diseases								
Apply chemicals in liquid form					2.5		2.8	
Determine amount of chemical to apply.					2.8	2.5	2.8	
Determine when to apply chemicals.					2.8	2.5	2.9	
Evaluate influence of diseases and pests on production.					2.6		2.9	
Evaluate life cycle of insects to determine proper control procedures						2.3	2.6	
Identify common diseases					2.4		2.9	
Identify common insects.					2.4		2.9	
Identify damage caused by insects and diseases					2.4		2.9	
Identify disease and insect resistant varieties to plant.					2.5		2.7	
Identify various means by which diseases and insects are spread.					2.4		2.7	
Mix chemicals.					2.6		2.6	
Select appropriate chemicals to control various insect pests and diseases					2.7		2.9	
Select appropriate method to apply chemicals					2.7		2.9	
Use mechanical and cultural means to control insects and diseases.					2.5		2.5	

TABLE XIII (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 37

CROP PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Inspect crops to determine when controls are needed					2.6	2.5	2.9	
Distinguish between harmful and beneficial insects					2.5		2.7	
Contact appropriate insect and disease specialists					2.4		2.6	
Interpret chemical labels					2.7		3.0	
Identify factors that influence chemical effectiveness					2.4		2.6	
Calculate costs of controls					2.6		2.6	
Recognize herbicide injury					2.8		2.8	
Select correct field travel and PTO speed for applying chemicals					2.9	2.5	2.9	
Calibrate chemical application equipment					2.9	2.5	3.0	
Select correct type and size nozzles and tips					2.9	2.4	2.9	
Adjust chemical application equipment					2.9	2.4	2.9	
Select proper application pressure					2.9	2.5	2.9	
Determine total amount of chemical needed					2.9		2.9	
Controlling Weeds								
Apply chemicals to control weeds					2.9	2.3	2.8	
Evaluate influence weeds have on crops					2.8		2.7	
Identify common weeds and weed seeds					2.8		2.8	
Inspect crops to determine when weed control is needed					2.8		2.7	
Evaluate influence cultivation has on yields, soil temperature, and soil moisture					2.7		2.6	
Establishing Crops								
Calibrate planting equipment					2.9	2.6		
Determine planting rate					2.9	2.5	2.5	
Determine when to plant					2.9	2.5	2.5	
Evaluate advantages and disadvantages of various varieties					2.8		2.4	
Identify plants					2.6	2.4	2.4	
Identify seeds					2.7		2.4	
Identify problems related to planting failures					2.8	2.4	2.6	
Interpret information on seed tags					2.8	2.3	2.3	
Operate planting equipment					2.6	2.5	2.3	
Prepare seedbed					2.8	2.6	2.3	
Select proper planting or seeding method					2.8	2.4	2.5	
Select companion crops					2.3	2.4		
Select variety to plant					2.7	2.4	2.5	

TABLE XIII (cont.)

38 AGRICULTURAL PRODUCTION COMMON CORE:

CROP PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Determine proper planting depth.					2.8	2.5	2.6	
Cultivate crops.					2.5		2.4	
Evaluate advantages and disadvantages of various planting methods.					2.7		2.4	
Marketing and Shipping Agricultural Products								
Evaluate influence market grade has on value .					2.5		2.6	
Inspect crop products for damage and defects .					2.4		2.6	
Harvesting Crops								
Determine latest dates for harvesting.					2.3		2.4	
Determine stage of maturity of crop.					2.7	2.3	2.7	
Evaluate influence stage of maturity has on product quality					2.7		2.5	
Follow weather forecasts					2.5	2.5	2.3	

TABLE XII (cont.)

AGRICULTURAL PRODUCTION COMMON CORE: 33

ANIMAL PRODUCTION

TASK STATEMENTS	Dairy Farmer	Swine Farmer	Beef Farmer	Horse Farm Hand	Grain Farmer	Forage Producer	Comm. Vegetable Producer	Farm Manager
Pen animals according to size, weight, and sex	2.5	2.3	2.4					
Remove afterbirth.	2.4	2.4	2.3	2.5				
Remove non-compatible animals.	2.3	2.4	2.3	2.5				
Regulate air movement and temperatures in housing facilities.	2.3	2.7		2.4				
Bed animals.	2.7	2.6	2.7	2.9				

Agricultural Business, Supply, and Service Common Core

A common core of tasks for the agricultural business industry was identified. In agricultural business, supply, and service, a task was selected for the common core if it was rated 2.3 or higher in each of two or more occupations. The common core tasks appear in TABLE XIV, organized within appropriate duty areas.

TABLE XIV

AGRICULTURAL BUSINESS, SUPPLY, AND SERVICE COMMON CORE

TASK STATEMENTS	Feed Salesman	Feed Mill Worker	Bulk Fertilizer Plant Worker	Chemical Applicator
Performing General Office Work				
Greet (meet) people	2.9		2.8	2.7
Use telephone	2.7	2.3	2.8	2.4
Inventorying Products and Supplies				
Take physical inventory	2.4	2.6	2.8	2.4
Determine inventory on hand	2.3	2.3	2.4	2.4
Following Legal Regulations				
Interpret feed additive mixing laws	2.7	2.5		
Following General Safety Precautions				
Apply minor first aid			2.7	2.6
Follow safe work habits		2.7	2.9	2.8
Identify potential safety hazards		2.6	2.8	2.7
Use fire extinguishers		2.7	2.8	2.5
Wear appropriate protective clothing			2.9	2.8
Ventilate work areas		2.4	2.8	2.5
Interpret information on labels and signs		2.6	2.9	2.9
Use proper lifting and carrying methods		2.4	2.5	2.4
Store inflammable materials			2.7	2.4
Wear appropriate work clothes			2.8	2.4
Adjust safety devices		2.3	2.8	2.5
Install safety devices			2.8	2.3
Correct potential safety hazards		2.3	2.8	2.6
Use electrical connectors and safety devices		2.7	2.8	
Identify safety zones around equipment		2.4	2.5	
Planning and Supervising Work				
Establish priorities on jobs		2.4		2.3
Selling Products				
Complete sales slip	2.7			2.3
Describe items to customers	2.9	2.4		2.3

TABLE XIV (cont.)

AGRICULTURAL BUSINESS, SUPPLY, AND SERVICE COMMON CORE

TASK STATEMENTS	Feed Salesman	Feed Mill Worker	Bulk Fertilizer Plant Worker	Chemical Applicator
Greet customers	2.7	2.7		2.3
Receive orders by telephone	2.6			2.4
Determine if merchandise requested is on hand	2.6			2.4
Handle customer complaints and objections	2.7			2.3
Storing and Warehousing Products and Supplies				
Remove damaged items from storage		2.6		2.5
Identify problems that might occur in storage		2.6	2.6	2.3
Determine when materials should be stored		2.3	2.7	2.4
Clean storage areas		2.7	2.7	2.3
Use rodent control measures in storage areas		2.4	2.4	
Label storage areas			2.7	2.3
Stack sacked materials		2.6	2.4	
Unload trucks or rail cars		2.4	2.8	
Lock warehouses and storage areas			2.9	2.5
Maintaining Equipment				
Add coolant to radiators			2.8	2.4
Add oil to equipment			2.9	2.6
Change oil and oil filters			2.8	2.3
Clean debris from equipment and vehicles		2.8	2.7	2.5
Grease equipment		2.9	2.8	2.5
Inflate tires			2.7	2.5
Inspect cooling system for leaks			2.7	2.4
Install and adjust belts		2.7	2.7	2.3
Install and adjust chains		2.7	2.7	
Interpret general maintenance instructions in operator's manuals		2.3	2.7	2.3
Replace bearings and seals		2.5	2.6	
Service air cleaners			2.7	2.4
Prepare equipment for storage			2.8	2.3
Lubricate and clean electric motors		2.5	2.6	
Oil equipment		2.5	2.9	2.5
Replace pulleys and sprockets		2.6	2.8	2.3
Reset electric motors		2.4	2.7	
Using and Maintaining Hand and Power Tools				
Clean tools			2.7	2.3
Identify tools		2.3	2.6	

TABLE XIV (cont.)

AGRICULTURAL BUSINESS, SUPPLY, AND SERVICE COMMON CORE

TASK STATEMENTS	Feed Salesman	Feed Mill Worker	Bulk Fertilizer Plant Worker	Chemical Applicator
Select tools for specific jobs		2.4	2.7	2.4
Store tools		2.3	2.7	
Use hand tools safely		2.5	2.7	2.5
Operating Equipment and Vehicles				
Interpret gauge readings on equipment		2.3	3.0	2.9
Operate equipment and vehicles on public highways		2.3	2.9	2.6
Adjust equipment safety shields		2.6	2.8	2.6
Connect hydraulic systems and hydraulic operated equipment			2.7	2.4
Correct potential equipment safety hazards		2.6	2.9	2.7
Hitch towed equipment			2.8	2.3
Identify equipment safety hazards		2.3	2.8	2.6
Install equipment safety shields and devices		2.4	2.9	2.4
Interpret hand operating signals			2.7	2.3
Interpret safety and operating instructions in equipment manuals		2.4	2.8	2.5
Interpret safety symbols on equipment		2.3	2.8	
Operate equipment under work conditions		2.9	2.8	2.6
Refuel power units			2.7	2.4
Use appropriate equipment and vehicles for specific jobs		2.5	2.9	2.6
Operate equipment at proper speeds		2.6		2.7
Picking Up and Delivering Materials and Supplies				
Load and unload bagged materials		2.6	2.8	
Maintaining and Constructing Buildings and Structures				
Reset circuit breakers		2.4	2.7	
Replace fuses		2.4	2.7	
Replace lighting fixtures and bulbs		2.5	2.4	
Formulating Feeds and Feeding Livestock				
Identify product and brand names	2.5	2.6		
Interpret feed tags and labels	2.5	2.5		
Interpret feeding charts and tables	2.4	2.5		

Agriculture Mechanics Common Core

A common core of tasks for the agriculture mechanics industry was identified. In agriculture mechanics, a task was selected for the common core if it was rated 2.3 or higher in each of two or more occupations. The common core tasks appear in TABLE XV, organized within appropriate duty areas.

TABLE XV

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Performing General Office Work				
Greet (meet) people	2.9	2.9	2.3	2.8
Use telephone	2.6		2.9	2.8
Write letters, notes, and memos	2.5		2.5	2.4
File technical publications and bulletins	2.4			2.7
Recording Information				
Record job ticket and work sheet information	2.9			3.0
Following General Safety Precautions				
Apply first aid to minor cuts, bruises, and burns	2.6			2.4
Follow safe work habits	3.0	2.8		2.9
Identify potential safety hazards	2.8	2.8		2.6
Use fire extinguishers	3.0	2.7		2.8
Wear appropriate protective clothing	2.6	2.7		2.6
Ventilate work areas	2.8	2.7		2.9
Interpret information on labels and signs	2.7	2.5		2.8
Use proper lifting and carrying methods	2.7	2.9		2.8
Store inflammable materials	2.6	2.8		
Wear appropriate work clothes	2.5	2.7		2.6
Adjust safety devices	2.7	2.8		2.9
Install safety devices	2.7			2.7
Correct potential safety hazards	2.6	2.8		2.8
Use electrical connectors and safety devices	2.7	2.9		2.6
Receiving Supplies and Products				
Check materials received against bill of lading		2.7	2.9	
Check for damaged items		2.9	2.9	
Handle stock to avoid damage		2.8	2.8	
Maintaining Equipment				
Add oil to equipment	2.9			3.0
Adjust carburetors	3.0			3.0
Adjust clutch pedal free travel	3.0			2.6
Change oil and oil filters	2.8			3.0
Clean debris from equipment and vehicles	2.9			2.9
Grease equipment	2.9	2.8		2.9

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Inflate tires	2.8	2.8		2.9
Install and adjust belts	2.9	2.6		2.9
Install and adjust chains	2.9	2.5		2.9
Install and service battery	2.9			2.9
Repack bearings	2.8			2.9
Replace and adjust spark plugs	3.0			3.0
Replace bearings and seals	2.8			3.0
Replace spark plug wires	2.9			2.7
Service air cleaners	3.0			2.8
Service fuel strainer, filters and sediment bowl	3.0			3.0
Oil equipment	2.9	2.7		2.7
Install carbureter repair kit	2.9			2.9
Using and Maintaining Hand and Power Tools				
Adjust tools	2.9	2.7		2.6
Clean tools	2.9	2.7		2.7
Identify tools	2.8	2.5		2.7
Interpret tool operation instructions	2.8	2.3		2.6
Select tools for specific jobs	2.9	2.6		3.0
Sharpen tools	2.5			2.8
Store tools	2.7	2.5		2.5
Use hand tools safely	2.9	2.8		3.0
Use power tools safely	2.9	2.9		2.9
Set-up tools	2.5			2.4
Operating Equipment and Vehicles				
Interpret gauge readings on equipment	3.0	2.9		2.9
Operate equipment and vehicles on public highways	2.8	2.8		
Adjust equipment safety shields	2.9			3.0
Connect front-end operated equipment	2.7	2.7		
Correct potential equipment safety hazards	2.9	2.8		2.8
Connect 3-point hitch equipment	2.8	2.7		
Hitch towed equipment	2.7	2.5		
Identify equipment safety hazards	2.8	2.5		2.9
Install equipment safety shields and devices	2.9	2.5		
Interpret hand operating signals	2.7	2.6		
Interpret safety and operating instructions in equipment manuals	2.9	2.6		
Interpret safety symbols on equipment	2.8	2.8		2.9
Operate equipment under work conditions	2.6			2.8
Refuel power units	2.5	2.5		2.7

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Using Technical Publications				
Locate the specifications for equipment	3.0	2.5	2.4	3.0
Locate appropriate manuals for equipment	2.9	2.5	2.6	3.0
Interpret sketches, figures, and descriptions in manuals	2.8	2.8	2.7	2.9
Follow written repair procedures	2.9			2.9
Picking Up and Delivering Materials and Supplies				
Complete delivery reports and logs	2.4	2.5		
Determine location of delivery	2.5	2.7	2.5	
Select appropriate delivery route	2.4	2.6		
Bind load with chains and binders	2.8	2.9		2.4
Load according to vehicle load limits	2.6	2.8		
Tow equipment	2.6	2.7		
Describe use of equipment operator's manual to customers	2.7	2.5		2.6
Describe general equipment operating procedures	2.8	2.5		2.7
Load and unload machinery and equipment	2.6			2.5
Constructing and Maintaining Buildings and Structures				
Remove trash from floors and work areas	2.6	2.8	2.5	2.8
Assembling and Installing Equipment and Structures				
Adjust belts on equipment	2.9			3.0
Adjust chains on equipment	2.9	2.7		2.9
Adjust controls on equipment	2.9	2.7		2.9
Check for missing equipment parts or hardware	2.6	3.0		2.7
Follow written assembly instructions	2.9	2.9		2.9
Identify hardware	3.0	2.8		2.9
Inspect assembled equipment for operating defects	2.9	2.8		2.9
Interpret assembly instructions	2.9	2.8		3.0
Use proper equipment and tools to assemble and install equipment and structures	2.8	2.8		2.9
Separate hardware into piles	2.4	2.5		
Arrange parts for ease in assembly	2.5	2.5		2.4
Tighten bolts in proper sequence	2.9	2.8		2.8
Check parts for damage	2.9	2.6		2.9

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Inspecting and Diagnosing Malfunctions				
Determine how breakage or defects in specific parts influence overall equipment operation	2.7			2.7
Determine potential causes of equipment failure from customer's description	2.7			2.5
Diagnose potential causes of equipment failure from symptoms observed	2.9			2.5
Visually inspect for defects	2.8		2.4	2.8
Interpret maintenance procedures for customers to prevent operating defects	2.7			2.5
Recommend appropropriate parts needed to correct equipment malfunctions	2.8		2.4	2.9
Follow troubleshooting procedures in service manuals	2.9			2.8
Operate equipment to identify potential defects	2.8			2.7
Correct, operate, and disconnect testing equipment	3.0			3.0
Repairing and Maintaining the Brake Systems				
Adjust mechanical brakes	2.9			2.6
Inspect backing plate, brake disk, pressure plates, and brake pistons	2.9			2.6
Replace brake lining	2.7			2.4
Remove and install cylinders, shoes, and disks	2.9			2.6
Test brakes after adjustment	2.9			2.9
Repairing and Maintaining Wheels, Tires, and Tracks				
Adjust wheel bearings	2.9			2.6
Inspect bearings and seals	2.9			2.9
Repairing and Maintaining the Steering System				
Adjust steering gear bearings	2.9			2.9
Remove and install ball joints	2.7			2.6
Remove and install tie rods	2.8			2.8
Replace steering gears and knuckles	2.8			2.9
Repairing and Maintaining the Power Train				
Check and adjust end-play on gears and shafts	3.0			2.9
Determine purpose of power train parts	2.7			2.5
Evaluate how contaminants influence tooth and gear wear	2.6			2.4
Identify gear tooth wear and failures	2.7			2.4
Identify parts of power train	2.9			2.8

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Drain, flush, and refill transmission	2.9			2.9
Pack bearings	2.9			3.0
Replace transmission oil seals	2.9			2.9
Open and close transmission case	2.8			2.9
Remove and install transmission drive shaft	2.9			3.0
Replace bearings in transmissions	2.9			3.0
Replace transmission oil filter	2.9			2.6
Replace gaskets in transmission	2.9			3.0
Remove and install differential	2.9			2.9
Replace ring gear, bevel gears, and pinion	3.0			2.9
Remove and install rear axle	2.8			2.9
Replace axle oil seals	2.8			3.0
Repairing and Maintaining the Hydraulic System				
Add hydraulic oil to system	2.9			2.9
Bleed hydraulic system or remote cylinders	2.8			2.6
Determine purpose of hydraulic system parts	2.9			2.6
Diagnose pump failures	2.9			2.6
Drain, clean, flush, and refill hydraulic system	2.9			2.8
Evaluate influence contaminants have on operation of hydraulic system	2.7			2.4
Identify parts of hydraulic system	2.9			2.6
Install O-rings, seals, and packing	3.0			2.8
Locate internal and external leakage problems	3.0			2.6
Remove and install hydraulic hoses or tubing	2.9			2.9
Remove and install hydraulic pumps	2.8			2.9
Replace cylinder barrels and cylinder rods	2.9			2.9
Replace hydraulic oil filters	2.9			2.9
Repairing and Maintaining the Ignition, Charging, and Starting System				
Check for spark	3.0			3.0
Check specific gravity of battery	2.8			2.9
Check timing	3.0			2.9
Clean starter drives	2.8			2.9
Conduct generator output test for amperage, voltage, and resistance	2.9			2.7
Conduct regulator current test	2.8			2.7
Conduct regulator voltage test	2.8			2.7
Determine purpose of parts in the system	2.9			2.9
Identify parts of the system	2.9			2.9
Inspect breaker points	2.9			3.0
Inspect for poor electrical connections	3.0			2.9
Inspect spark plugs	2.9			3.0

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Inspect switches	3.0			2.9
Install and adjust breaker points	3.0			3.0
Install and adjust generator belts	2.9			2.8
Make no load test on starter	2.6			2.5
Polarize the generator	3.0			2.6
Remove and install generator	2.9			2.8
Remove and install regulator	2.9			2.8
Remove and install starter	2.9			3.0
Test coil when cold and hot	2.6			2.9
Test condensor for resistance, leakage, and capacity	2.6			2.7
Test ignition system for open circuits, grounds, and resistance with voltmeter	2.7			2.8
Unlock starter	2.7			2.6
Wire the ignition, charging, and starting circuits	2.9			2.9
Replace field windings in starter	2.3			2.8
Replace ignition switches	2.9			2.7
Repairing and Maintaining Electrical Accessories				
Install wiring harness	3.0			2.8
Repair broken electrical wires	2.9			2.9
Replace circuit breakers	2.9			2.6
Replace fuses	2.9			2.9
Replace gauges	2.9			2.9
Replace light bulbs	2.8			2.9
Replace switches	3.0			2.9
Test circuits for shorts, grounds, and open circuits	3.0			2.9
Test operation of gauges	2.8			2.9
Overhauling and Maintaining Engines				
Adjust valve clearance	3.0			3.0
Check compression	3.0			2.9
Clean head	2.9			2.9
Clean oil and water passages	2.9			2.9
Deglaze cylinders	2.8			2.9
Determine function of engine parts	2.9			2.9
Grind valves	2.9			2.9
Identify parts of engine	3.0			3.0
Install head gaskets	3.0			3.0
Install valve guides	2.9			2.9
Inspect and measure camshaft bushings	2.9			2.4
Inspect and measure valve seats	2.9			2.9

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Inspect and replace gaskets	3.0			3.0
Inspect and replace valve springs	2.0			2.9
Inspect camshaft and measure camshaft tolerances	2.9			2.8
Inspect crankshaft and measure tolerances	3.0			2.9
Inspect cylinder and measure cylinder bore	2.9			2.9
Inspect engine block	2.9			2.9
Inspect head and head gasket	3.0			2.9
Inspect main bearings and measure main bearing clearance	3.0			3.0
Inspect connecting rods and measure rod bearing clearance	3.0			2.9
Inspect pistons and measure piston tolerances	3.0			3.0
Inspect piston pins and measure pin tolerances	3.0			2.9
Inspect piston rings and measure piston ring tolerances	3.0			2.9
Lap valves	2.6			2.6
Measure camshaft end play	2.9			2.4
Measure crankshaft end play	2.9			2.9
Measure valve guide tolerances	2.8			2.8
Reface valve seats	2.8			2.6
Remove and install camshaft	3.0			3.0
Remove and install camshaft bushings	2.8			2.4
Remove and install camshaft gear	3.0			2.9
Remove and install crankshaft	3.0			2.9
Remove and install engine	3.0			2.9
Remove and install front and rear oil seals	3.0			3.0
Remove and install head	3.0			3.0
Remove and install piston assembly	3.0			2.9
Remove and install piston rings	3.0			2.9
Remove and install piston pins	2.9			2.9
Remove and install oil pan	2.9			2.9
Remove and install valves	2.9			3.0
Remove and install valve seat inserts	2.6			2.4
Remove and install timing chain	2.8			2.4
Remove and install rod bearing inserts	2.9			2.4
Remove cylinder ridge	3.0			2.9
Remove or add shims	2.9			2.8
Remove and replace main bearings	3.0			2.7
Remove and replace flywheel	2.9			3.0
Torque rod bearing caps	3.0			3.0
Torque main bearings	3.0			2.9
Torque head bolts	3.0			3.0
Time valve assembly	3.0			2.9

TABLE XV (cont.)

AGRICULTURAL MECHANICS COMMON CORE

TASK STATEMENTS	Agr.-Ind. Equip. Mechanic	Set-Up and Delivery Man	Partsman	Horticulture Firm Equip. Mechanic
Repairing and Maintaining Governoring Systems				
Adjust for proper engine speed.	3.0			3.0
Inspect components of governor.	3.0			2.9
Remove and install governor and/or ventilator pump.	3.0			2.9
Replace governor thrust bearings and weights.	2.9			3.0
Repairing and Maintaining Oil Lubrication Systems				
Remove and install oil pump	2.9			2.6
Repairing and Maintaining Gas and Diesel Fuel Systems				
Clean carburetor.	2.9			3.0
Determine purpose of various parts.	2.9			2.9
Identify parts of fuel system	2.9			2.9
Remove and install fuel tank.	2.8			2.9
Remove and install gas fuel pump.	2.8			2.7
Remove and install manifolds.	2.9			2.6
Replace fuel filters.	2.9			2.7
Replace fuel lines.	2.9			2.9
Replace needle bearings	2.8			2.7
Test fuel pump.	2.5			2.6
Repairing and Maintaining Non-Power Equipment				
Operate arc welder.	2.5			2.3
Operate oxyacetylene welder	2.5			2.3
Prepare and fit metal to be welded.	2.5			2.3

Horticulture Common Core

A common core of tasks for the horticultural industry was identified. In horticulture, a task was selected for the common core if it was rated 2.3 or higher in each of two or more occupations. The common core tasks appear in TABLE XVI, organized within appropriate duty areas.

TABLE XVI

HORTICULTURE COMMON CORE

TASK STATEMENTS	Horticulture Occupations			
	Tree Service Worker	Greenhouse Worker	Floral Designer	Retail Landscape and Garden Store Salesman
Performing General Office Work				
Use telephone	2.5		2.8	2.9
Write letters, notes, and memos	2.3			2.6
Following General Safety Precautions				
Apply first aid	2.8	2.3	2.3	
Follow safe work habits		2.8	2.7	
Identify potential safety hazards	2.9	2.7	2.5	
Store chemicals	2.3	2.6	2.3	
Use fire extinguishers	2.7	2.4	2.4	
Wear appropriate protective clothing	2.8	2.7		
Interpret information on labels and signs	2.8	2.7		
Use proper lifting and carrying methods	2.8	2.6		
Store inflammable materials	2.5	2.4		
Wear appropriate work clothes	2.8	2.3		
Dispose of chemical containers	2.5	2.4		
Correct potential safety hazards	2.9	2.5		
Planning and Supervising Work				
Plan daily work schedule	2.4		2.3	
Marketing and Selling Products and Merchandise				
Complete sales slip			2.6	2.7
Describe items to customer			2.5	2.8
Display items for customers			2.4	2.5
Interpret customer's descriptions of items			2.6	2.7
Interpret plant and flower care instructions for customers			2.6	3.0
Label products and merchandise			2.4	2.6
Receive orders by telephone		2.4	2.8	2.6
Stock shelves and display cases			2.5	2.3
Operate cash register			2.6	2.5
Maintaining Equipment and Vehicles				
Add oil to equipment	2.7	2.5		
Change oil and oil filters	2.7	2.3		
Clean debris from equipment and vehicles	2.7	2.5		

TABLE XVI (cont.)

HORTICULTURE COMMON CORE

TASK STATEMENTS	Horticulture Occupations			
	Tree Service Worker	Greenhouse Worker	Floral Designer	Retail Landscape and Garden Store Salesman
Grease equipment	2.6	2.4		
Inflate tires	2.5	2.4		
Interpret equipment maintenance instructions in operator's manuals	2.7	2.3		
Using and Maintaining Hand and Power Tools				
Adjust tools	2.7	2.4		
Clean tools	2.8	2.5		
Identify tools	2.7	2.5		
Interpret tool operation instructions	2.7	2.4		
Select tools for specific jobs	2.7	2.5		
Sharpen tools	2.8	2.3		
Store tools	2.5	2.5		
Use hand tools safely	2.9	2.7		
Use power tools safely	2.9	2.8		
Fertilizing Horticultural Plants, Trees, Shrubs, and Lawns				
Determine amount of fertilizer and lime to apply	2.9	2.5		2.8
Determine kind of lime and fertilizer to apply	2.7	2.5		2.8
Determine when to apply fertilizer and lime	2.7	2.5		2.8
Identify nutrient deficiency symptoms in growing plants	2.6	2.4		2.4
Interpret labels on fertilizer bags	2.7	2.6		
Prepare fertilizer solutions	2.5	2.6		
Select appropriate method to apply fertilizer	2.5			2.6
Operating Equipment and Vehicles				
Interpret gauge readings on equipment	2.8	2.3		
Operate equipment and vehicles on public highways	3.0	2.3		
Interpret safety and operating instructions in operator's manual	2.7	2.3		
Operate equipment under work conditions	2.9	2.4		
Refuel power units	2.8	2.3		
Use appropriate equipment and vehicles for specific jobs	2.7	2.5		
Controlling Plant Insects and Diseases				
Determine amount of chemicals to apply	2.4	2.6		
Determine when to apply chemicals	2.4	2.7		
Evaluate the influence of diseases and insects on plant growth	2.3	2.5		

TABLE XVI (cont.)

HORTICULTURE COMMON CORE

TASK STATEMENTS	Horticulture Occupations			
	Tree Service Worker	Greenhouse Worker	Floral Designer	Retail Landscape and Garden Store Salesman
Evaluate life cycle of insects to determine appropriate control procedures	2.5	2.6		
Identify common insects	2.5	2.6		2.7
Identify damage caused by insects and diseases	2.6	2.5		2.7
Identify means by which diseases and insects are spread	2.4	2.4		
Mix chemicals	2.3	2.4		
Select appropriate chemicals to control insects and diseases	2.5	2.5		2.9
Select appropriate method to apply chemicals	2.3	2.5		
Inspect plants to determine when insect and disease controls are needed	2.4	2.6		
Controlling Weeds				
Evaluate influence weeds have on plant growth		2.3		2.5
Select appropriate chemicals to control weeds		2.3		2.8
Establishing Trees, Shrubs, Flowers, and Grasses				
Determine when trees and plants may be moved or give advice	2.4			2.8
Mulch planting areas or advise on mulching	2.4			2.8
Plant trees and shrubs or advise on planting	2.4			2.9
Water plants or advise on watering	2.5			2.6
Maintaining Buildings and Facilities				
Remove trash and debris from work areas	2.6	2.3	2.5	
Maintaining Trees, Shrubs, Flowers, and Grasses				
Identify parts to be pruned	2.8			2.6

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations were formulated by the project staff with the assistance of the state and national advisory committees to the project. The committee explored possible utilization of the findings in developing improved programs of occupational exploration in agriculture, ninth and tenth grade vocational agriculture, eleventh and twelfth grade vocational agriculture, specialized vocational agriculture programs for specific occupational areas, curriculum development, and teacher education.

Conclusions

Conclusions were formulated based on the data from occupational surveys in 28 agricultural occupations. In addition to the 20 occupations previously reported in this report, data were available for the following: animal health assistant, park worker, buildings and grounds foreman, soil conservation aide, sawmill worker, timber harvest worker (all-round logger), meat cutter, and dairy plant worker. Conclusions follow:

1. A common core of basic skills across the 28 agricultural occupations selected for this study was not identified. Tasks identified as common were generally needed by workers in all fields, even those not classified as agricultural. This finding supports the recent trend to organize vocational education in agriculture by taxonomy areas rather than continue one program as preparation for all agricultural occupations.

2. Too few occupations were examined in the taxonomies of forestry, natural resources, and food processing to establish a common core within those areas. A minimum of four occupations was needed to develop a common core within a taxonomy.

3. The occupational survey approach to curriculum development provides a realistic base for developing an instructional program. The procedure used in conducting occupational surveys collects data concerning "what is."

4. Commonality and importance ratings of tasks may not always be directly related. Many important tasks required for specific occupations must be learned to succeed in those occupations but did not appear in the common core for the taxonomy.

Recommendations

Recommendations were developed in subcommittee meetings of the state and national advisory committees and the project staff. Recommendations follow:

1. Essential tasks in agricultural occupations should be used in developing occupational profiles for use in vocational counseling and guidance.

2. Tasks from a wide range of occupational areas in agriculture should be utilized in curriculum development for occupational exploration programs in agriculture.

3. Teachers responsible for developing programs of occupational exploration in agriculture should put major emphasis on career implications, using skill development as a vehicle for instruction.

4. Teachers of vocational education programs in agriculture should utilize the common core tasks within their taxonomy in developing their instructional program. They should supplement the common core with tasks unique to specific occupations for which graduates are being prepared.

5. Task inventories should be used in cooperative vocational education programs in agriculture in developing individual training plans for students.

6. Task inventories provide check lists which should be used in evaluating student learning in vocational programs.

7. The potential tasks in any occupational preparation program should be validated by a local advisory committee and adapted to the needs of the community.

8. The number of tasks which must be learned by students should be used to justify a four-year vocational agriculture program with sufficient time allocated to develop competent graduates.

9. Instruction in vocational education in agriculture should be organized by taxonomy.

10. Instruction in vocational education in agriculture at all levels should be task or skill oriented.

11. Findings of this study should provide a sound basis for development of competency-based instructional packages. The tasks should be developed as behavioral objectives with more specific skills taught as steps to meet the objectives.

12. The task inventories should be used as a resource in developing the technical agriculture competencies needed for a competency-based teacher education program.

13. The task inventories should be used for self evaluation by teachers to determine their inservice education needs.

14. Workshops on the use of tasks lists for curriculum improvement should be held which involve teacher educators, state supervisors, curriculum developers, and teachers.

15. Further research is needed to complete occupational surveys in occupations not examined in this study.

16. Evaluations of current national, state, and local curriculum guides should be conducted to ascertain whether tasks rated as essential in this study are being taught in vocational education programs in agriculture.

17. Further research to identify common tasks within taxonomy areas is needed. Such research should examine at least four occupations per taxonomy but more if resources are sufficient.

18. Other service areas of vocational education should utilize similar procedures in identifying essential skills within occupations and within their taxonomy areas.

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